EXAMPLE 2 Solve a radical equation given a function

WIND VELOCITY In a hurricane, the mean sustained wind velocity v (in meters per second) is given by

$$v(p) = 6.3\sqrt{1013 - p}$$

where p is the air pressure (in millibars) at the center of the hurricane. Estimate the air pressure at the center of a hurricane when the mean sustained wind velocity is 54.5 meters per second.

ANOTHER WAY
For alternative methods for solving the problem in Example 2, turn to page 460 for the **Problem Solving Workshop**.

Solution

$v(p) = 6.3\sqrt{1013 - p}$	Write given function.
$54.5 = 6.3\sqrt{1013 - p}$	Substitute 54.5 for $v(p)$.
$8.65 \approx \sqrt{1013 - p}$	Divide each side by 6.3.
$(8.65)^2 \approx (\sqrt{1013 - p})^2$	Square each side.
$74.8 \approx 1013 - p$	Simplify.
$-938.2 \approx -p$	Subtract 1013 from each side.
$938.2 \approx p$	Divide each side by -1.

▶ The air pressure at the center of the hurricane is about 938 millibars.

GUIDED PRACTICE for Example 2

4. **WHAT IF?** Use the function in Example 2 to estimate the air pressure at the center of a hurricane when the mean sustained wind velocity is 48.3 meters per second.

RATIONAL EXPONENTS When an equation contains a power with a rational exponent, you can solve the equation using a procedure similar to the one for solving radical equations. In this case, you first isolate the power and then raise each side of the equation to the reciprocal of the rational exponent.

EXAMPLE 3 TAKS PRACTICE: Multiple Choice

What is the solution of the equation $3x^{2/3} = 48$?

Ⓐ 4 Ⓑ 9 Ⓒ 64 Ⓓ 256

Solution

$3x^{2/3} = 48$	Write original equation.
$x^{2/3} = 16$	Divide each side by 3.
$(x^{2/3})^{3/2} = 16^{3/2}$	Raise each side to the power $\frac{3}{2}$.
$x = 64$	Simplify.

▶ The correct answer is C. Ⓐ Ⓑ Ⓒ Ⓓ